

OIEP

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/993,241

DATE: 12/11/2001

TIME: 11:31:21

Input Set : N:\jumbos\008000051CNUS01.txt

Output Set: N:\CRF3\12112001\I993241.raw

4 <110> APPLICANT: KAKKIS, EMIL D.
 6 <120> TITLE OF INVENTION: METHODS FOR TREATING DISEASES CAUSED BY DEFICIENCIES OF
 7 RECOMBINANT ALPHA-L-IDURONDINASE
 9 <130> FILE REFERENCE: 008000051CNUS01
 C--> 11 <140> CURRENT APPLICATION NUMBER: US/09/993,241
 12 <141> CURRENT FILING DATE: 2001-11-13
 14 <150> PRIOR APPLICATION NUMBER: 09/711,205
 15 <151> PRIOR FILING DATE: 2000-11-09
 17 <150> PRIOR APPLICATION NUMBER: 09/439,923
 18 <151> PRIOR FILING DATE: 1999-11-12
 20 <160> NUMBER OF SEQ ID NOS: 2
 22 <170> SOFTWARE: FastSEQ for Windows Version 3.0
 24 <210> SEQ ID NO: 1
 25 <211> LENGTH: 6200
 26 <212> TYPE: DNA
 27 <213> ORGANISM: Homo sapiens
 29 <220> FEATURE:
 30 <221> NAME/KEY: CDS
 31 <222> LOCATION: (1558)...(3510)
 33 <400> SEQUENCE: 1
 34 gacggatcgg gagatctccc gatccccctat ggtcgactct cagtacaatc tgctctgatg 60
 35 ccgcatagtt aagccagtat ctgctccctg cttgtgtgtt ggaggtcgct gagtagtgcg 120
 36 cgagcaaaat ttaagctaca acaaggcaag gcttgaccga caattgcatg aagaatctgc 180
 37 ttagggttag gcgttttgcg ctgcttcgcg atgtacgggc cagatatacg cgttgacatt 240
 38 gattattgac tagttattaa tagtaataca ttacggggtc attagttcat agcccatata 300
 39 tggagtcccg cgttacataa cttacggtaa atggcccgc tggctgaccg cccaacgacc 360
 40 cccgccatt gacgtcaata atgacgtatg ttcccatagt aacgccaata gggactttcc 420
 41 attgacgtca atgggtggac tatttacggt aaactgccca cttggcagta catcaagtgt 480
 42 atcatatgcc aagtagcacc cctattgacg tcaatgacgg taaatggccc gcctggcatt 540
 43 atgccagta catgacctta tgggaacttc ctacttgcca gtacatctac gtattagtca 600
 44 tcgctattac catggtgatg cggttttggc agtacatcaa tgggcgtgga tagcggtttg 660
 45 actcacggg atttccaagt ctccacccca ttgacgtcaa tgggagtttg ttttggcacc 720
 46 aaaatcaacg ggactttcca aaatgtcgta acaactccgc ccattgacg caaatgggcg 780
 47 gtaggcgtgt acgggtgggag gtctatataa gcagagctct ctggctaact agagaacca 840
 48 ctgcttaact ggcttatcga aattaatacg actcactata gggagacca agcttcgcag 900
 49 aattcctgcg gctgctacag tgtgtccagc gtccctgcctg gctgtgctga gcgctggaac 960
 50 agtggcgcat cattcaagtg cacagttacc catcctgagt ctggcacctt aactggcaca 1020
 51 attgccaaag tcacaggtga gctcagatgc ataccaggac attgtatgac gttccctgct 1080
 52 cacatgcctg cttttcttct ataatacaga tgctcaacta actgctcatg tccttatatc 1140
 53 acagagggaa attggagcta tctgaggaa tgcccagaag ggaagggcag aggggtcttg 1200
 54 ctctccttgt ctgagccata actcttcttt ctacctcca gtgaacacct tcccacccca 1260
 55 ggtccacctg ctaccgccgc cgtcggagga gctggccctg aatgagctct tgtccctgac 1320
 56 atgcctgggt cgagctttca accctaaaga agtgcgtgtg cgatggctgc atggaaatga 1380
 57 ggagctgtcc ccagaaagct acctagtgtt tgagcccta aaggagccag gcgagggagc 1440
 58 caccacctac ctggtgacaa gcgtgttgcg tgtatcagct gaaagcttga tatcgaattc 1500
 59 cggaggcgga accggcagtg cagcccgaag ccccgagtc cccgagcacg cgtggcc atg 1560
 60 Met

DATE: 12/11/2001

PATENT APPLICATION: US/09/993,241

TIME: 11:31:21

Input Set : N:\jumbos\008000051CNUS01.txt

Output Set: N:\CRF3\12112001\I993241.raw

61																	1	
63	cgt	ccc	ctg	cgc	ccc	cgc	gcc	gcg	ctg	ctg	gcg	ctc	ctg	gcc	tcg	ctc	1608	
64	Arg	Pro	Leu	Arg	Pro	Arg	Ala	Ala	Leu	Leu	Ala	Leu	Leu	Ala	Ser	Leu		
65	5				10				15									
67	ctg	gcc	gcg	ccc	ccg	gtg	gcc	ccg	gcc	gag	gcc	ccg	cac	ctg	gtg	cat	1656	
68	Leu	Ala	Ala	Pro	Pro	Val	Ala	Pro	Ala	Glu	Ala	Pro	His	Leu	Val	His		
69	20				25				30									
71	gtg	gac	gcg	gcc	cgc	gcg	ctg	tgg	ccc	ctg	cgg	cgc	ttc	tgg	agg	agc	1704	
72	Val	Asp	Ala	Ala	Arg	Ala	Leu	Trp	Pro	Leu	Arg	Arg	Phe	Trp	Arg	Ser		
73	35				40				45									
75	aca	ggc	ttc	tgc	ccc	ccg	ctg	cca	cac	agc	cag	gct	gac	cag	tac	gtg	1752	
76	Thr	Gly	Phe	Cys	Pro	Pro	Leu	Pro	His	Ser	Gln	Ala	Asp	Gln	Tyr	Val		
77	50				55				60				65					
79	ctc	agc	tgg	gac	cag	cag	ctc	aac	ctc	gcc	tat	gtg	ggc	gcc	gtc	cct	1800	
80	Leu	Ser	Trp	Asp	Gln	Gln	Leu	Asn	Leu	Ala	Tyr	Val	Gly	Ala	Val	Pro		
81	70				75				80									
83	cac	cgc	ggc	atc	aag	cag	gtc	cgg	acc	cac	tgg	ctg	ctg	gag	ctt	gtc	1848	
84	His	Arg	Gly	Ile	Lys	Gln	Val	Arg	Thr	His	Trp	Leu	Leu	Glu	Leu	Val		
85	85				90				95									
87	acc	acc	agg	ggg	tcc	act	gga	cgg	ggc	ctg	agc	tac	aac	ttc	acc	cac	1896	
88	Thr	Thr	Arg	Gly	Ser	Thr	Gly	Arg	Gly	Leu	Ser	Tyr	Asn	Phe	Thr	His		
89	100				105				110									
91	ctg	gac	ggg	tac	ctg	gac	ctt	ctc	agg	gag	aac	cag	ctc	ggg	ttt	gag	1944	
92	Leu	Asp	Gly	Tyr	Leu	Asp	Leu	Leu	Arg	Glu	Asn	Gln	Leu	Gly	Phe	Glu		
93	115				120				125									
95	ctg	atg	ggc	agc	gcc	tcg	ggc	cac	ttc	act	gac	ttt	gag	gac	aag	cag	1992	
96	Leu	Met	Gly	Ser	Ala	Ser	Gly	His	Phe	Thr	Asp	Phe	Glu	Asp	Lys	Gln		
97	130				135				140				145					
99	cag	gtg	ttt	gag	tgg	aag	gac	ttg	gtc	tcc	agc	ctg	gcc	agg	aga	tac	2040	
100	Gln	Val	Phe	Glu	Trp	Lys	Asp	Leu	Val	Ser	Ser	Leu	Ala	Arg	Arg	Tyr		
101	150				155				160									
103	atc	ggt	agg	tac	gga	ctg	gcg	cat	gtt	tcc	aag	tgg	aac	ttc	gag	acg	2088	
104	Ile	Gly	Arg	Tyr	Gly	Leu	Ala	His	Val	Ser	Lys	Trp	Asn	Phe	Glu	Thr		
105	165				170				175									
107	tgg	aat	gag	cca	gac	cac	cac	gac	ttt	gac	aac	gtc	tcc	atg	acc	atg	2136	
108	Trp	Asn	Glu	Pro	Asp	His	His	Asp	Phe	Asp	Asn	Val	Ser	Met	Thr	Met		
109	180				185				190									
111	caa	ggc	ttc	ctg	aac	tac	tac	gat	gcc	tgc	tcg	gag	ggt	ctg	cgc	gcc	2184	
112	Gln	Gly	Phe	Leu	Asn	Tyr	Tyr	Asp	Ala	Cys	Ser	Glu	Gly	Leu	Arg	Ala		
113	195				200				205									
115	gcc	agc	ccc	gcc	ctg	cgg	ctg	gga	ggc	ccc	ggc	gac	tcc	ttc	cac	acc	2232	
116	Ala	Ser	Pro	Ala	Leu	Arg	Leu	Gly	Gly	Pro	Gly	Asp	S					

RAW SEQUENCE LISTING

DATE: 12/11/2001

PATENT APPLICATION: US/09/993,241

TIME: 11:31:21

Input Set : N:\jumbos\008000051CNUS01.txt

Output Set: N:\CRF3\12112001\I993241.raw

127	tcc ctc cac agg aag ggt gcg cgc agc tcc atc tcc atc ctg gag cag	2376
128	Ser Leu His Arg Lys Gly Ala Arg Ser Ser Ile Ser Ile Leu Glu Gln	
129	260 265 270	
131	gag aag gtc gtc gcg cag cag atc cgg cag ctc ttc ccc aag ttc gcg	2424
132	Glu Lys Val Val Ala Gln Gln Ile Arg Gln Leu Phe Pro Lys Phe Ala	
133	275 280 285	
135	gac acc ccc att tac aac gac gag gcg gac ccg ctg gtg ggc tgg tcc	2472
136	Asp Thr Pro Ile Tyr Asn Asp Glu Ala Asp Pro Leu Val Gly Trp Ser	
137	290 295 300 305	
139	ctg cca cag ccg tgg agg gcg gac gtg acc tac gcg gcc atg gtg gtg	2520
140	Leu Pro Gln Pro Trp Arg Ala Asp Val Thr Tyr Ala Ala Met Val Val	
141	310 315 320	
143	aag gtc atc gcg cag cat cag aac ctg cta ctg gcc aac acc acc tcc	2568
144	Lys Val Ile Ala Gln His Gln Asn Leu Leu Ala Asn Thr Thr Ser	
145	325 330 335	
147	gcc ttc ccc tac gcg ctc ctg agc aac gac aat gcc ttc ctg agc tac	2616
148	Ala Phe Pro Tyr Ala Leu Leu Ser Asn Asp Asn Ala Phe Leu Ser Tyr	
149	340 345 350	
151	cac ccg cac ccc ttc gcg cag cgc acg ctc acc gcg cgc ttc cag gtc	2664
152	His Pro His Pro Phe Ala Gln Arg Thr Leu Thr Ala Arg Phe Gln Val	
153	355 360 365	
155	aac aac acc cgc ccg ccg cac gtg cag ctg ttg cgc aag ccg gtg ctc	2712
156	Asn Asn Thr Arg Pro Pro His Val Gln Leu Leu Arg Lys Pro Val Leu	
157	370 375 380 385	
159	acg gcc atg ggg ctg ctg gcg ctg ctg gat gag gag cag ctc tgg gcc	2760
160	Thr Ala Met Gly Leu Leu Ala Leu Leu Asp Glu Glu Gln Leu Trp Ala	
161	390 395 400	
163	gaa gtg tcg cag gcc ggg acc gtc ctg gac agc aac cac acg gtg ggc	2808
164	Glu Val Ser Gln Ala Gly Thr Val Leu Asp Ser Asn His Thr Val Gly	
165	405 410 415	
167	gtc ctg gcc agc gcc cac cgc ccc cag ggc ccg gcc gac gcc tgg cgc	2856
168	Val Leu Ala Ser Ala His Arg Pro Gln Gly Pro Ala Asp Ala Trp Arg	
169	420 425 430	
171	gcc gcg gtg ctg atc tac gcg agc gac gac acc cgc gcc cac ccc aac	2904
172	Ala Ala Val Leu Ile Tyr Ala Ser Asp Asp Thr Arg Ala His Pro Asn	
173	435 440 445	
175	cgc agc gtc gcg gtg acc ctg cgg ctg cgc ggg gtg ccc ccc ggc ccg	2952
176	Arg Ser Val Ala Val Thr Leu Arg Leu Arg Gly Val Pro Pro Gly Pro	
177	450 455 460 465	
179	ggc ctg gtc tac gtc acg cgc tac ctg gac aac ggg ctc tgc agc ccc	3000
180	Gly Leu Val Tyr Val Thr Arg Tyr Leu Asp Asn Gly Leu Cys Ser Pro	
181	470 475 480	
183	gac ggc gag tgg cgg cgc ctg ggc cgg ccc gtc ttc ccc acg gca gag	3048
184	Asp Gly Glu Trp Arg Arg Leu Gly Arg Pro Val Phe Pro Thr Ala Glu	
185	485 490 495	
187	cag ttc cgg cgc tag cgc gcg gct gag gac ccg gtg gcc gcg gcg ccc	3096
188	Gln Phe Arg Arg * Arg Ala Ala Glu Asp Pro Val Ala Ala Ala Pro	
189	500 505 510	
191	cgc ccc tta ccc gcc ggc ggc cgc ctg agg ctg cgc ccc gcg ctg cgg	3144

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/993,241

DATE: 12/11/2001

TIME: 11:31:21

Input Set : N:\jumbos\008000051CNUS01.txt

Output Set: N:\CRF3\12112001\I993241.raw

```

192 Arg Pro Leu Pro Ala Gly Gly Arg Leu Arg Leu Arg Pro Ala Leu Arg
193          515          520          525
195 ctg ccg tcg ctt ttg ctg gtg cac gtg tgt gcg cgc ccc gag aag ccg      3192
196 Leu Pro Ser Leu Leu Leu Val His Val Cys Ala Arg Pro Glu Lys Pro
197          530          535          540
199 ccc ggg cag gtc acg cgg ctc cgc gcc ctg ccc ctg acc caa ggg cag      3240
200 Pro Gly Gln Val Thr Arg Leu Arg Ala Leu Pro Leu Thr Gln Gly Gln
201          545          550          555          560
203 ctg gtt ctg gtc tgg tcg gat gaa cac gtg ggc tcc aag tgc ctg tgg      3288
204 Leu Val Leu Val Trp Ser Asp Glu His Val Gly Ser Lys Cys Leu Trp
205          565          570          575
207 aca tac gag atc cag ttc tct cag gac ggt aag gcg tac acc ccg gtc      3336
208 Thr Tyr Glu Ile Gln Phe Ser Gln Asp Gly Lys Ala Tyr Thr Pro Val
209          580          585          590
211 agc agg aag cca tcg acc ttc aac ctc ttt gtg ttc agc cca gac aca      3384
212 Ser Arg Lys Pro Ser Thr Phe Asn Leu Phe Val Phe Ser Pro Asp Thr
213          595          600          605
215 ggt gct gtc tct ggc tcc tac cga gtt cga gcc ctg gac tac tgg gcc      3432
216 Gly Ala Val Ser Gly Ser Tyr Arg Val Arg Ala Leu Asp Tyr Trp Ala
217          610          615          620
219 cga cca ggc ccc ttc tcg gac cct gtg ccg tac ctg gag gtc cct gtg      3480
220 Arg Pro Gly Pro Phe Ser Asp Pro Val Pro Tyr Leu Glu Val Pro Val
221          625          630          635          640
223 cca aga ggg ccc cca tcc ccg ggc aat cca tgagcctgtg ctgagcccca      3530
224 Pro Arg Gly Pro Pro Ser Pro Gly Asn Pro
225          645          650
227 gtgggttgca cctccaccgg cagtcagcga gctggggctg cactgtgccc atgctgccct      3590
228 cccatcaccc cctttgcaat atatttttat attttaaaaa aaaaaaaaaa aaaaaaaaaa      3650
229 aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aattcctgca      3710
230 gcccggggga tccactagtt ctagagggcc cgtttaaacc cgctgatcag cctcgactgt      3770
231 gccttctagt tgccagccat ctgttggttg cccctccccc gtgccttcc tgcacctgga      3830
232 aggtgccact cccactgtcc tttcctaata aaatgaggaa attgcatcgc attgtctgag      3890
233 taggtgtcat tctattctgg ggggtggggg ggggcaggac agcaaggggg aggattggga      3950
234 agacaatagc aggcattgctg gggatgcggt gggctctatg gcttctgagg cgaaagaac      4010
235 cagctggggc tcgagagcct ggcgtaatac tggctatagc tgtttctgt gtgaaattgt      4070
236 tatccgctca caattccaca caacatacga gccggaagca taaagtgtaa agcctgggg      4130
237 gcctaattgag tgagctaact cacattaatt gcgttgcgct cactgcccgc tttccagtcg      4190
238 ggaaacctgt cgtgccagct gcattaatga atcgccaac gcgcggggag aggcggtttg      4250
239 cgtattgggc gctcttcgc ttcctcgctc actgactcgc tgcgctcggt cgttcggctg      4310
240 cggcgagcgg tatcagctca ctcaaaggcg gtaatacggg tatccacaga atcaggggat      4370
241 aacgcaggaa agaacatgtg agcaaaaggc cagcaaaagg ccaggaaccg taaaaaggcc      4430
242 gcgttgctgg cgtttttcca taggctccgc cccctgacg agcatcaca aaatcgacgc      4490
243 tcaagtcaga ggtggcgaaa ccgacagga ctataaagat accaggcggt tccccctgga      4550
244 agctccctcg tgcgctctcc tgttccgacc ctgccgctta ccggatacct gtccgccttt      4610
245 ctcccttcgg gaagcgtggc gctttctcaa tgctcacgct gtaggtatct cagttcggtg      4670
246 taggtcgttc gctccaagct gggctgtgtg cacgaacccc ccgttcagcc cgaccgctgc      4730
247 gccttatccg gtaactatcg tcttgagtc aacccggtaa gacacgactt atcgccactg      4790
248 gcagcagcca ctggtaacag gattagcaga gcgaggtatg taggcgggtg tacagagttc      4850
249 ttgaagtggg ggcctaacta cggctacact agaaggacag tatttggtat ctgcgctctg      4910

```

RAW SEQUENCE LISTING

DATE: 12/11/2001

PATENT APPLICATION: US/09/993,241

TIME: 11:31:21

Input Set : N:\jumbos\008000051CNUS01.txt

Output Set: N:\CRF3\12112001\I993241.raw

```

250 ctgaagccag ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa acaaaccacc 4970
251 gctggttagcg gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa aaaaggatct 5030
252 caagaagatc ctttgatctt ttctacggg tctgacgctc agtggaacga aaactcacgt 5090
253 taagggattt tggatcatgag attatcaaaa aggatcttca cctagatcct tttaaattaa 5150
254 aaatgaagtt ttaaataaat ctaaagtata tatgagtaaa cttggtctga cagttacca 5210
255 tgcttaataca gtgaggcacc tatctcagcg atctgtctat ttcgttcacc catagttgcc 5270
256 tgactccccg tcgtgtagat aactacgata cgggagggct taccatctgg cccagtgct 5330
257 gcaatgatac cgcgagaccc acgtcacccg gctccagatt tatcagcaat aaaccagcca 5390
258 gccggaaggc ccgagcgcag aagtggctct gcaactttat ccgcctccat ccagtctatt 5450
259 aattggtgcc gggaagctag agtaagtagt tcgccagtta atagtttgcg caacgttggt 5510
260 gccattgcta caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc attcagctcc 5570
261 ggttcccaac gatcaaggcg agttacatga tccccatgt tgtgcaaaaa agcggtttagc 5630
262 tccttcggtc ctccgatcgt tgtcagaagt aagttggccg cagtgttatc actcatggtt 5690
263 atggcagcac tgcataattc tcttactgtc atgccatccg taagatgctt ttctgtgact 5750
264 ggtgagtact caaccaagtc attctgagaa tagtgtatgc ggcgaccgag ttgctcttgc 5810
265 ccggcgtaaa tacgggataa taccgcgcca catagcagaa ctttaaaagt gctcatcatt 5870
266 ggaaaacggt cttcggggcg aaaactctca aggatcttac cgctgttgag atccagttcg 5930
267 atgtaacca ctcgtgcacc caactgatct tcagcatctt ttactttcac cagcgtttct 5990
268 gggtagacaa aaacaggaag gcaaaatgcc gcaaaaaagg gaataagggc gacacggaaa 6050
269 tgttgaatac tcatactctt cctttttcaa tattattgaa gcatttatca gggttattgt 6110
270 ctcatgagcg gatacatatt tgaatgtatt tagaaaaata aacaaatagg ggttccgcgc 6170
271 acatttcccc gaaaagtgcc acctgacgtc 6200
273 <210> SEQ ID NO: 2
274 <211> LENGTH: 650
275 <212> TYPE: PRT
276 <213> ORGANISM: Homo sapiens
278 <400> SEQUENCE: 2
279 Met Arg Pro Leu Arg Pro Arg Ala Ala Leu Leu Ala Leu Leu Ala Ser
280 1 5 10 15
281 Leu Leu Ala Ala Pro Pro Val Ala Pro Ala Glu Ala Pro His Leu Val
282 20 25 30
283 His Val Asp Ala Ala Arg Ala Leu Trp Pro Leu Arg Arg Phe Trp Arg
284 35 40 45
285 Ser Thr Gly Phe Cys Pro Pro Leu Pro His Ser Gln Ala Asp Gln Tyr
286 50 55 60
287 Val Leu Ser Trp Asp Gln Gln Leu Asn Leu Ala Tyr Val Gly Ala Val
288 65 70 75 80
289 Pro His Arg Gly Ile Lys Gln Val Arg Thr His Trp Leu Leu Glu Leu
290 85 90 95
291 Val Thr Thr Arg Gly Ser Thr Gly Arg Gly Leu Ser Tyr Asn Phe Thr
292 100 105 110
293 His Leu Asp Gly Tyr Leu Asp Leu Leu Arg Glu Asn Gln Leu Gly Phe
294 115 120 125
295 Glu Leu Met Gly Ser Ala Ser Gly His Phe Thr Asp Phe Glu Asp Lys
296 130 135 140
297 Gln Gln Val Phe Glu Trp Lys Asp Leu Val Ser Ser Leu Ala Arg Arg
298 145 150 155 160
299 Tyr Ile Gly Arg Tyr Gly Leu Ala His Val Ser Lys Trp Asn Phe Glu
300 165 170 175

```

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/993,241

DATE: 12/11/2001

TIME: 11:31:22

Input Set : N:\jumbos\008000051CNUS01.txt

Output Set: N:\CRF3\12112001\I993241.raw

L:11 M:270 C: Current Application Number differs, Replaced Current Application Number